

Fig 1. Photo of new target - showing original flat surface of the target and the attached backing plate.

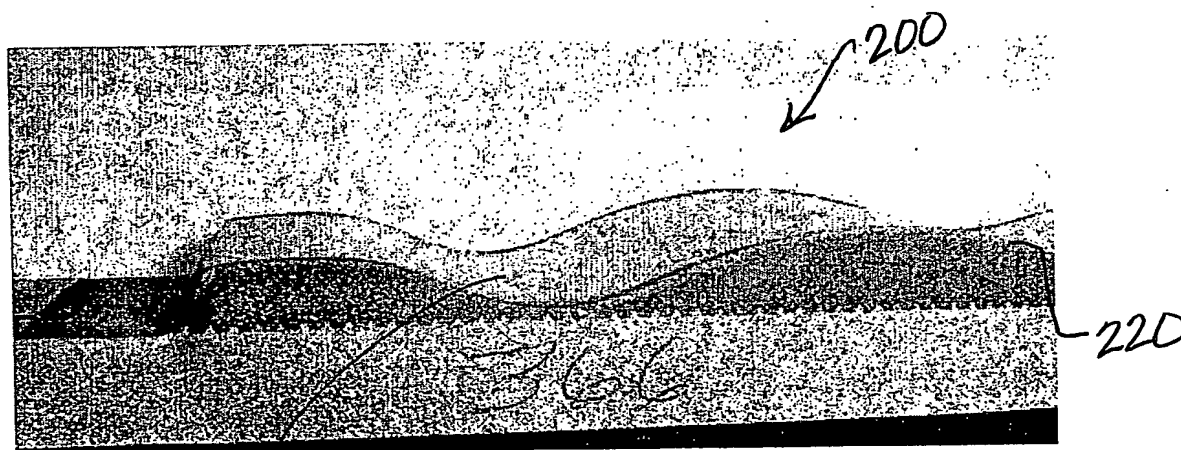


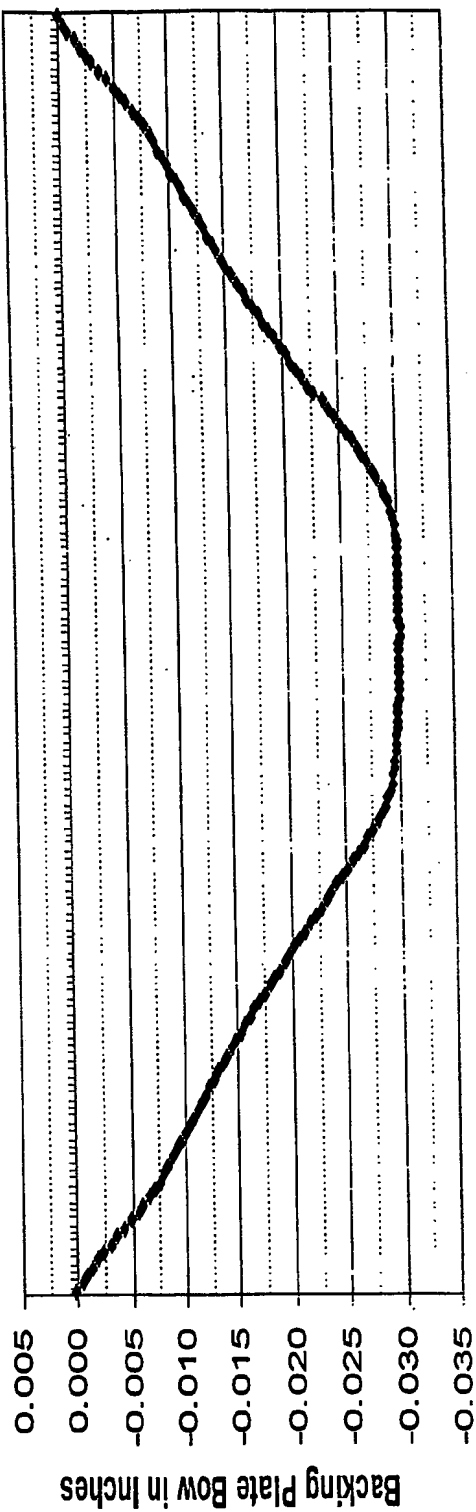
Fig 2. Photo of a non-uniformly worn sputter target

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Figure 3

1051.9 kwhrs

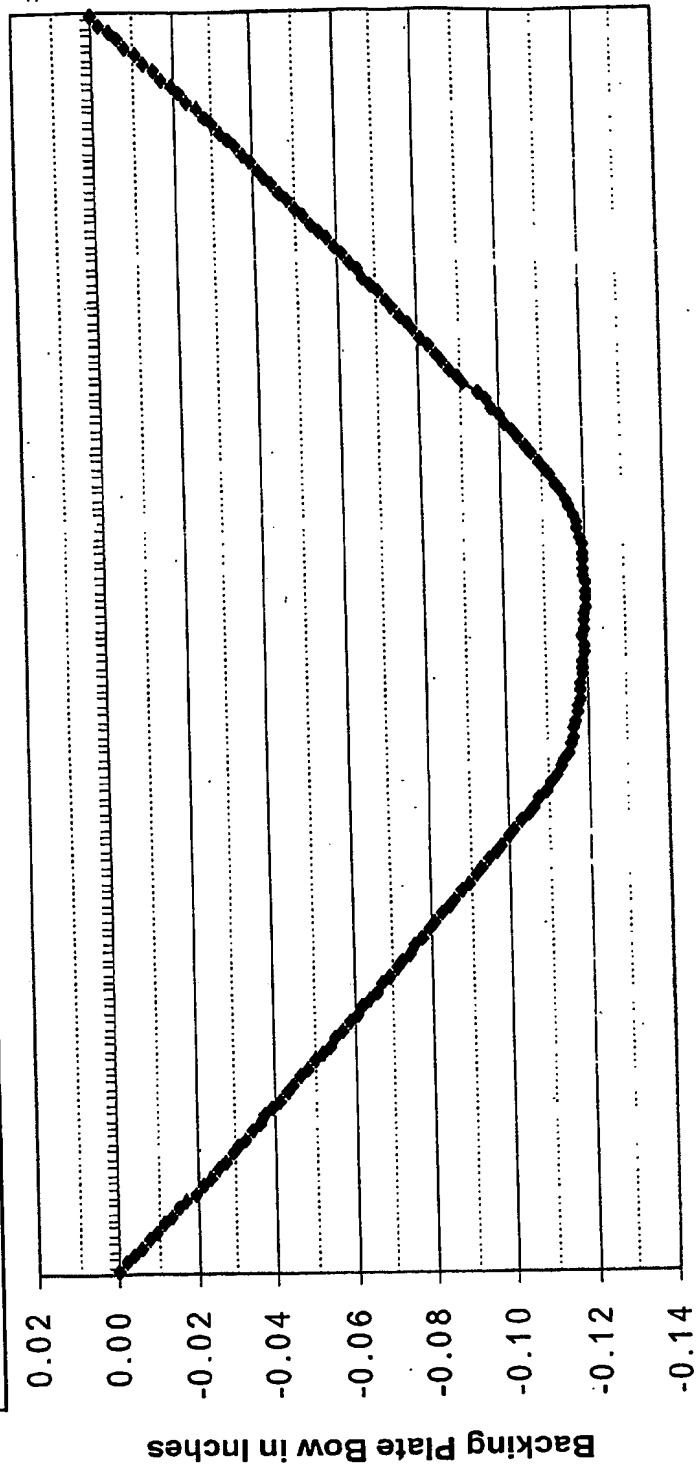
Maximum bow @ 0.030"



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Figure 4

850 kWhrs  
0.120" maximum bow



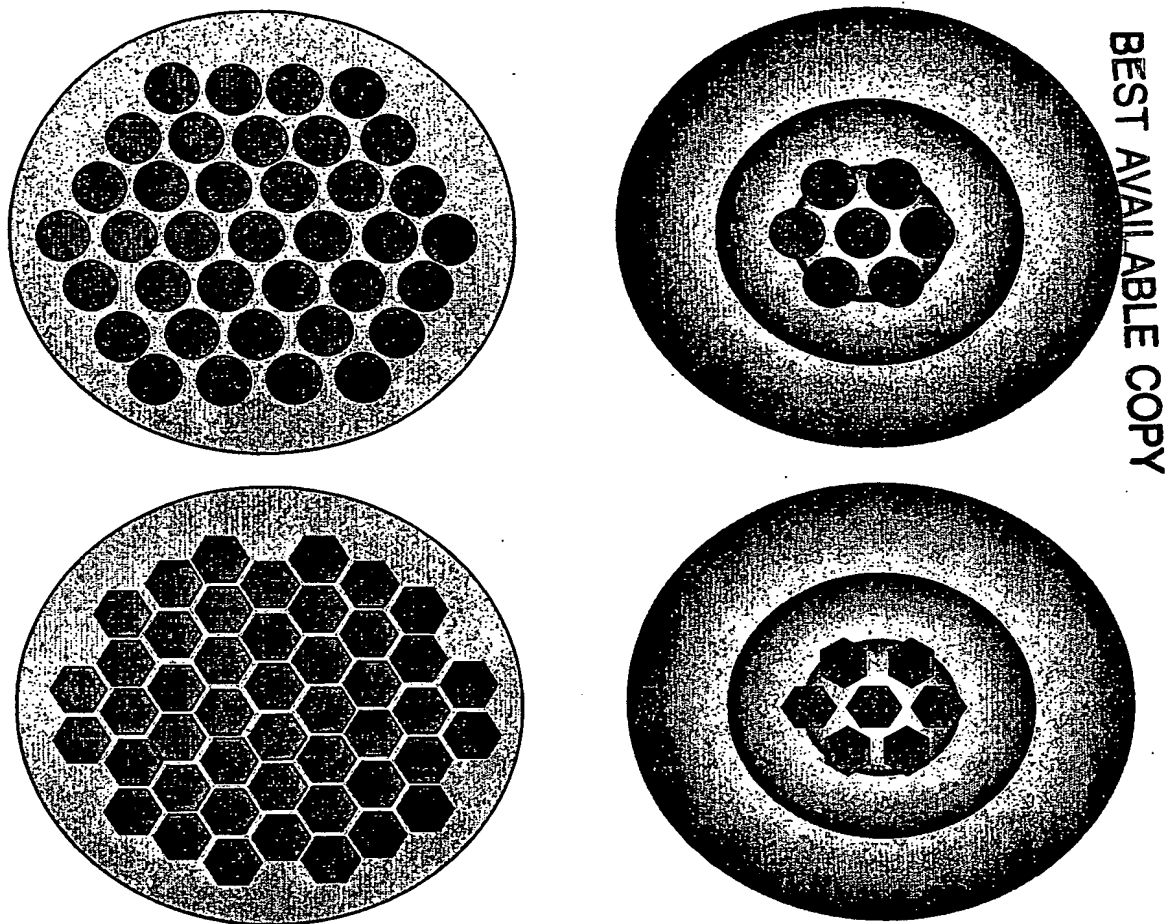
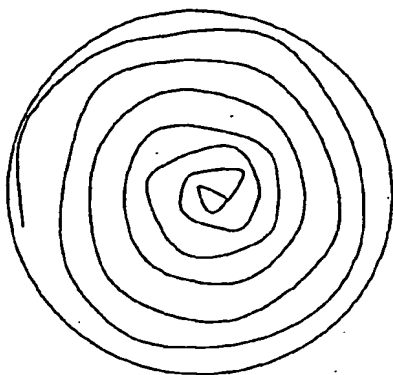
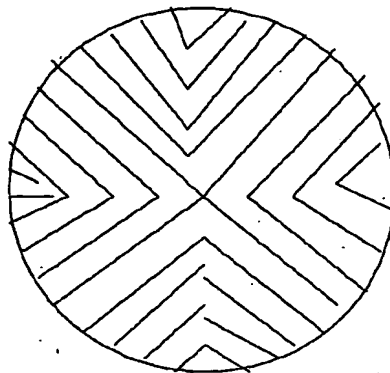


Fig. 5 showing other core backing component configurations to increase surface area by surface area modification.

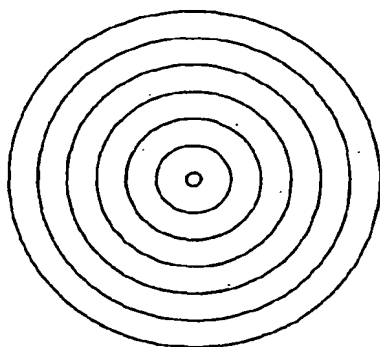
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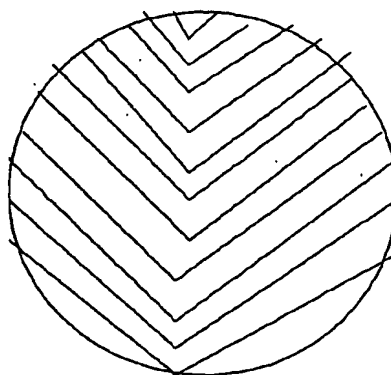
Spiral



"Center" Chevron

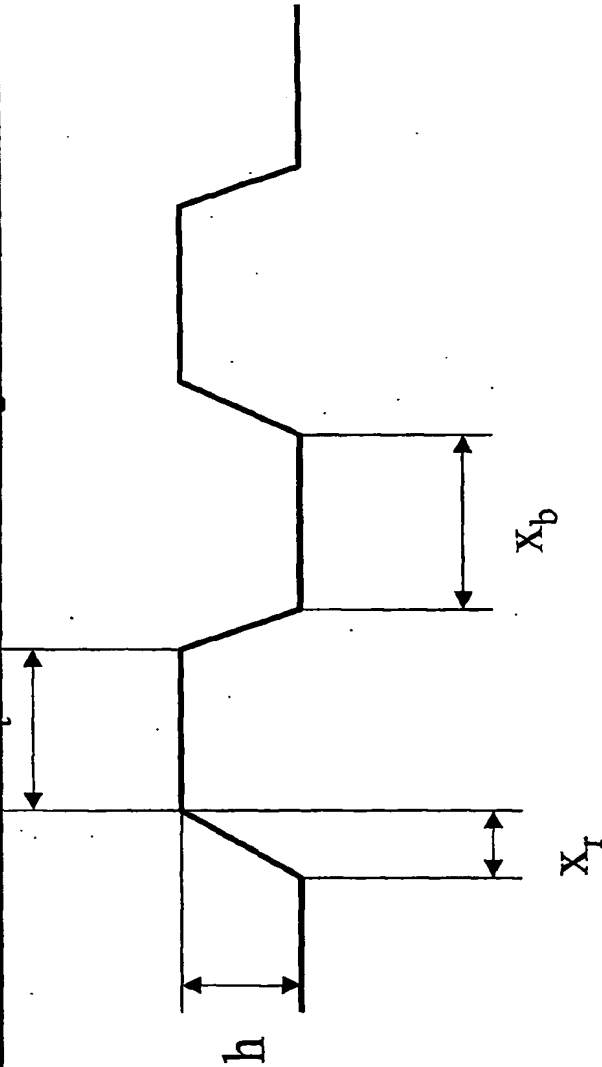


Concentric Grooves  
Design #1 and #2



"Side" Chevron

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Design 2:

$h$	$= 2.0 \text{ mm (0.08")}$
$x_t$	$= 4.0 \text{ mm}$
$x_b$	$= 2.0 \text{ mm}$
$x_r$	$= 0.5 \text{ mm}$

Design 1:

$h$	$= 2.0 \text{ mm (0.08")}$
$x_t$	$= 3.0 \text{ mm}$
$x_b$	$= 3.0 \text{ mm}$
$x_r$	$= 1.0 \text{ mm}$

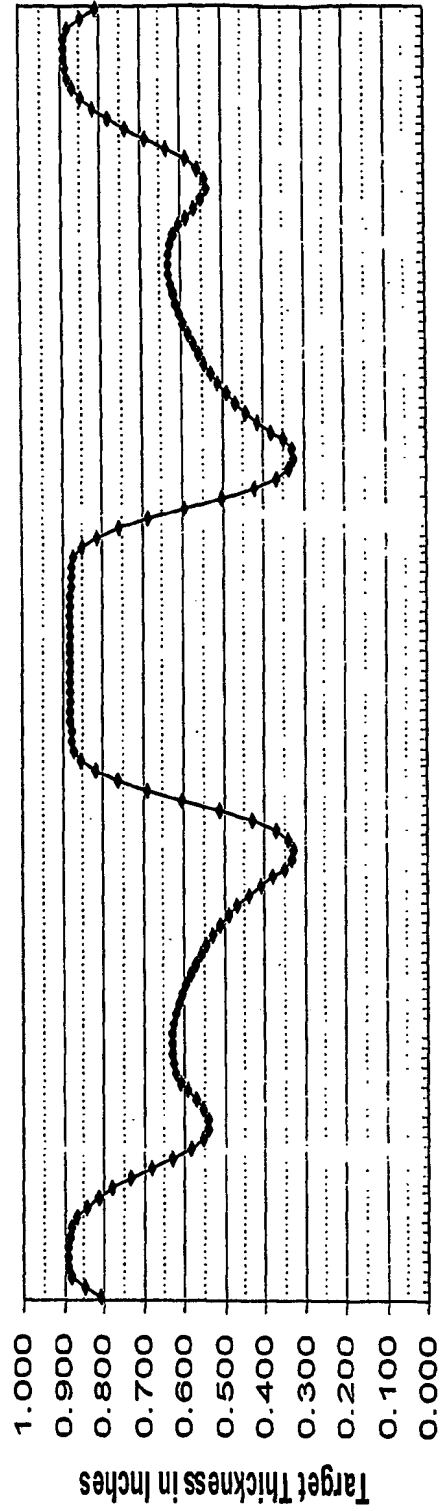
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Figure 8: Center Cooling - Erosion Profile

1051.9 kwhrs  
0.600" Sputtered

Erosion Profile

Figure 8



48% of thickness  
sputtered

Figure 9

≈850 kWhrs  
0.435" Sputtered

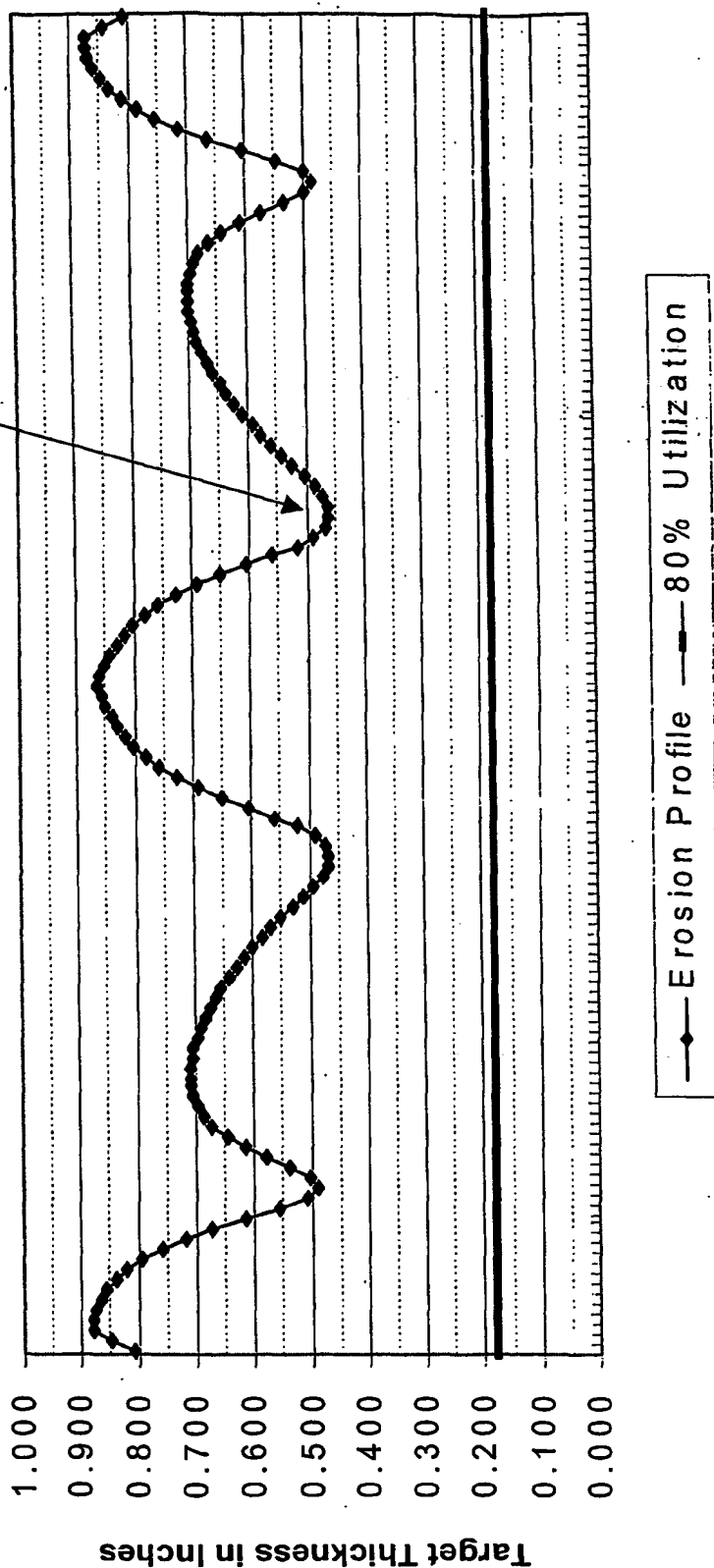




Figure 10 Stress-Strain Curve

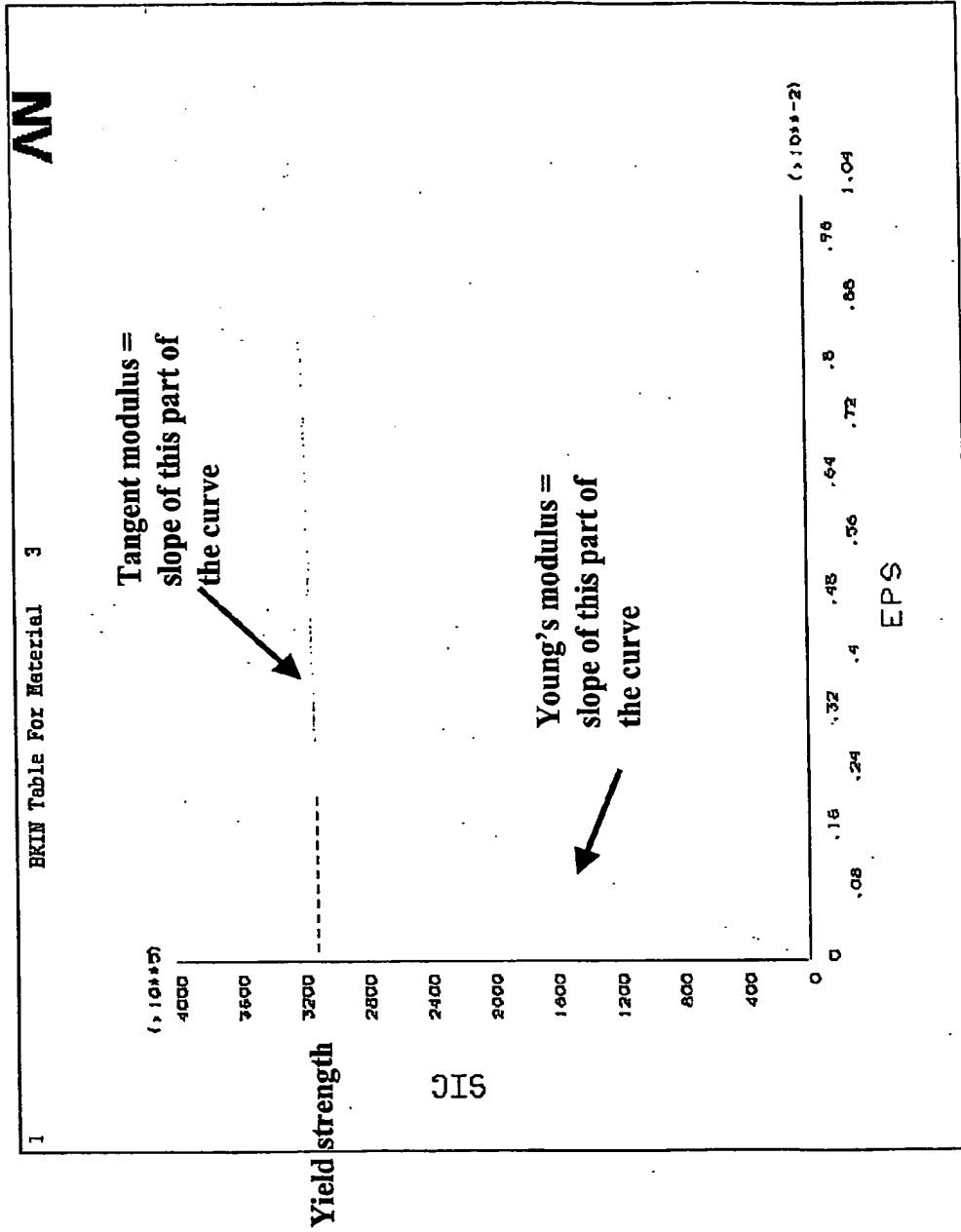


Figure 41

850 kWhrs

temperature distribution:



Monolithic - APEX

DMX = .003093  
SMN = 47.906  
SMX = 166.674  
47.906  
61.103  
74.299  
87.495  
100.692  
113.888  
127.085  
140.281  
153.478  
166.674



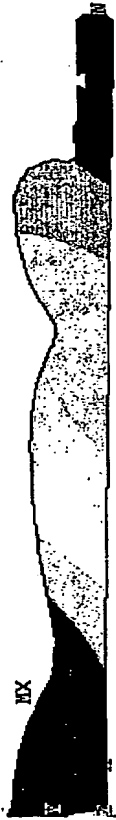
Enhanced cooling design 1 - APEX

DMX = .002672  
SMN = 42.832  
SMX = 146.821  
42.832  
54.386  
65.941  
77.495  
89.049  
100.604  
112.158  
123.712  
135.267  
146.821

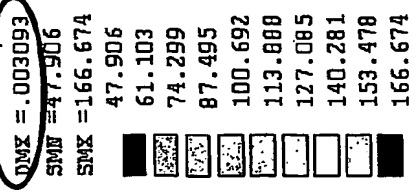
Figure 12

850 kWhrs

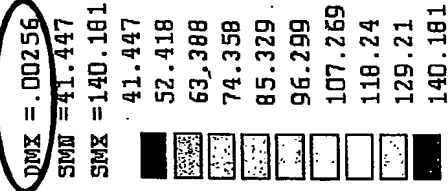
temperature distribution:



Monolithic - APEX



Enhanced cooling design 2 - APEX



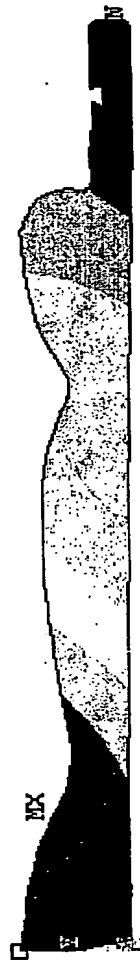
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Figure 13

### 850 kWhrs

temperature distribution:

.002873



Monolithic ECAE

DMX = .002873  
SMN = 47.906  
SMX = 166.674  
47.906  
51.103  
74.299  
87.495  
100.692  
113.888  
127.085  
140.281  
153.478  
166.674

### 1400 kWhrs

.003123



Monolithic ECAE

DMX = .003123  
SMN = 45.675  
SMX = 178.473  
45.675  
60.43  
75.186  
89.941  
104.696  
119.452  
134.207  
148.962  
163.718  
178.473

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Figure 14

850 kWhrs

temperature distribution:



Enhanced cooling design 2 - ECAE



Enhanced cooling design 2 - APEX

DMX = .002362  
SMN = 41.447  
SMX = 140.181  
41.447  
52.418  
63.388  
74.358  
85.329  
96.299  
107.269  
118.24  
129.21  
140.181

DMX = .00256  
SMN = 41.447  
SMX = 140.181  
41.447  
52.418  
63.388  
74.358  
85.329  
96.299  
107.269  
118.24  
129.21  
140.181

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1400 kWhrs

temperature distribution:



Monolithic - APEX



Enhanced cooling design 2 - APEX

DMX = .003437  
SMIN = 45.675  
SMX = 178.473  
45.675  
60.43  
75.186  
89.941  
104.696  
119.452  
134.207  
148.962  
163.718  
178.473

DMX = .003162  
SMIN = 39.667  
SMX = 147.744  
39.667  
51.676  
63.684  
75.693  
87.701  
99.71  
111.719  
123.727  
135.736  
147.744